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DoD 6055.5-M



DEPARTMENT OF DEFENSE

OCCUPATIONAL HEALTH SURVEILLANCE MANUAL

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ASSISTANT SECRETARY OF DEFENSE
(MANPOWER, RESERVE AFFAIRS, AND LOGISTICS)

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MANPOWER,
RESERVE AFFAIRS
AND LOGISTICS

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

DoD 6055.5-M

July 26, 1982

FOREWORD

This manual is issued under the authority of DoD Instruction 6055.5, "Industrial Hygiene and Occupational Health," April 30, 1980. Its purpose is to help occupational health professionals and others to recognize and evaluate health risks associated with workplace agent-specific exposures. Chapter 2 contains medical surveillance procedures for workers exposed to chemical agents. Medical surveillance procedures for workplace physical and biological agent exposures will be addressed in Chapters 3 and 4, which will be issued at a later date.

This manual applies to the Office of the Secretary of Defense, the Military Departments, the Organization of the Joint Chiefs of Staff, the Unified and Specified Commands, and the Defense Agencies (hereafter called "DoD Components"). Its provisions encompass job-related medical monitoring of military and civilian workers. The manual does not apply, however, to contractors.

The manual is effective immediately. Heads of DoD Components may issue supplementary instructions when necessary to provide for unique requirements within their respective Components.

The Navy, as the designated executive agent, shall chair a meeting of DoD Component representatives at least annually to

1. Suggest additional agents to be considered for inclusion in the manual.
2. Develop surveillance protocols for each agent.
3. Review and update this manual.

DoD Components may obtain copies of this manual through their own publication channels. Other federal agencies and the public may obtain copies from the Director, U.S. Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

Lawrence J. Korh
Assistant Secretary of Defense
(Manpower, Reserve Affairs, and Logistics)

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REFERENCES

- (a) DoD Instruction 6055.5, "Industrial Hygiene and Occupational Health,"
April 30, 1980
- (b) Title 29, United States Code, Section 651 et seq. (1976), "Occupational
Safety and Health Act of 1970," as amended (29 CFR 1910)

DEFINITIONS

1. Occupational Health Medical Surveillance Examination. Occupationally related medical history and physical examinations and clinical laboratory tests (preplacement or baseline, special purpose periodic, and termination) that are performed to assess the health status of individuals as related to their work. Unlike diagnostic internal medical investigations, occupational medical examinations are designed to produce specific information upon which decisions may be based regarding adequacy of protection against potential workplace hazards. This examination may include

a. Occupationally Related Medical History. Information regarding an individual's medical background including occupational exposures and family and personal health.

b. Physical Examination. The process of medically evaluating fitness to perform work while ruling out evidence of acute and chronic injury and disease, using mainly inspection, palpation, percussion, and auscultation.

c. Clinical Laboratory Tests. Clinical tests and measurements used to detect the absorption of toxic agents, or the physiologic or pathologic effects caused by their absorption.

2. Regulated Area. An area where entry and exit is restricted or controlled because of potential exposures to environmental hazards.

3. Worker. Any DoD employee, military or civilian, who may be exposed to potentially hazardous materials in the workplace.

4. Workplace. A physically definable area where work is performed. Workplaces may be administrative, military operational, or industrial, and may be staffed by civilian or military personnel.

CHAPTER 1

GENERAL INFORMATIONA. PURPOSE

This manual has been developed to provide occupational health professionals and others with a useful reference, oriented toward specific chemical, physical, and biological hazards common throughout the Department of Defense, for the medical surveillance of the DoD work force. Since occupational diseases can largely be prevented or their effects minimized through appropriate environmental and medical surveillance, use of this manual will strengthen the DoD Components' occupational health programs. Its implementation shall satisfy the basic medical surveillance program prescribed in DoD Instruction 6055.5 (reference (a)) by providing uniform procedures to help identify the health risks associated with workplace hazards.

B. SCOPE

1. This manual summarizes existing mandatory occupational health medical surveillance requirements found in 29 U.S.C. 651 (reference (b)). Additional guidance is provided to help ensure the utility of this manual as a reference for DoD health care professionals. While the underlying intent in providing this guidance is to encourage greater standardization in medical surveillance procedures, it should also help indicate both the nature of occupational health medical surveillance generally and the need for specialized occupational health consultation.

2. Because of the multitude of different potentially hazardous materials found in DoD workplaces and the variety of conditions in which exposure to them might occur, the medical surveillance examinations recommended in this manual may not be all-inclusive or always appropriate. The procedures contained in this manual may, therefore, be expanded upon or otherwise modified in DoD Component-specific occupational health programs to tailor, when necessary, medical surveillance for specific workplaces or other exposures.

C. REQUIREMENTS1. General

a. Industrial hygiene surveys of workplaces shall be performed to identify all potential exposures and shall be evaluated to establish complete workplace exposure profiles. Documentation of these activities is required. See reference (a) for additional guidance on industrial hygiene surveillance.

b. The health of exposed workers also shall be monitored by medical surveillance examinations, including medical and occupational histories, clinical and biological screening tests, and physical examinations. Examination results shall be documented and stored in the worker's medical record.

2. Occupational Health Medical Surveillance. Through this portion of the DoD occupational safety and health program, the Department of Defense meets legal and regulatory requirements, assesses the effects of the workplace on the workers'

health, identifies any medical conditions that limit ability to perform assigned duties, and meets its obligation to promote full health in its military and civilian work force.

a. Medical Surveillance

(1) Types

(a) Preplacement or Baseline. These specific examinations are designed to assess physical capabilities and limitations in relation to job requirements, and to document baseline data for future use in the evaluation of potential exposures of DoD workers.

(b) Special Purpose Periodic. These specific examinations are conducted at intervals to evaluate and document the health effects of occupational exposures. The frequency and extent of these assessments are based on the industrial hygiene surveillance findings that quantify the exposure or exposures of concern, and on the findings of previous medical surveillance examinations. These periodic examinations may include interval history, limited physical examination, and clinical and biological screening tests. The scope of these examinations is determined locally after consideration of all relevant exposure factors, the information contained in this manual, and any additional professional and regulatory guidance.

(c) Termination. These specific examinations, performed at termination of employment, are designed to assess pertinent aspects of the worker's health. Documentation of examination results may be beneficial in assessing the relationship of any future medical problems to work or exposure in the workplace. This is particularly applicable to those conditions that are chronic or that may have long latency periods.

(2) Procedures

(a) Based on the results of industrial hygiene surveys of the workplace and on review of previous occupational health experience and applicable directives, the DoD Components shall administer occupational health medical surveillance examinations in accordance with in DoD Instruction 6055.5 (reference (a)) and this manual.

(b) Regulatory requirements prescribed in 29 U.S.C. 651 et seq. (reference (b)) for medical surveillance examinations will be contained in subsequent chapters of this manual.

(c) DoD Components also shall establish examination requirements to determine an employee's ability to use respirators, pursuant to reference (b).

(d) When there are no legal standards for medical examinations for specific agents, the appropriate recommendations in this manual are useful. These guidelines were developed from National Institute for Occupational

Safety and Health publications and occupational health textbooks, and may be used when

1 Workers are protected from exposures exceeding recommended exposure limits through the use of respirators.

2 Unprotected workers are exposed to one half or more of a recommended exposure limit, or significant concern exists because of potential skin absorption.

3 Workers are known to have been severely exposed above recommended exposure limits or are known to have had skin contact with certain chemicals during emergencies or accidents.

(e) If medical surveillance examinations are deemed inappropriate or of little value in determining the significance of an occupational exposure, documentation of the rationale used in making this decision shall be maintained locally.

(3) Recordkeeping

Occupational health medical surveillance examinations shall be recorded and maintained in accordance with DoD Instruction 6055.5 (reference (a)) and DoD Components' implementing directives.

b. Epidemiology

DoD Components shall accumulate appropriate data to allow trend analysis and early detection of job-related abnormalities that, if undetected and uncorrected over a working lifetime, might be associated with high risk of impairment, disability, or death.

CHAPTER 2

MEDICAL SURVEILLANCE PROCEDURES
FOR CHEMICAL HAZARDS

This chapter contains required and recommended medical surveillance examinations for workers occupationally exposed to chemical hazards. Those medical surveillance procedures that include a citation to 29 CFR 1910 (reference (b)) are mandatory. If there is no regulatory requirement, the guidelines in subparagraph C.2.a.(2)(d), Chapter 1, shall be used to determine whether medical surveillance is needed.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
2-Acetylaminofluorene	<ol style="list-style-type: none">1. Physical exam with attn. to<ol style="list-style-type: none">a. Deficient immuno-competenceb. Treatment with steroids or cytotoxicsc. Pregnancy2. Personal, family, and occupational histories, including<ol style="list-style-type: none">a. Genetic factorsb. Environmental factorsc. Cigarette smoking	At least annually. Same as in A.	Cancer hazard (suspect). Requirements apply to all workers entering a regulated area.
Acrylamide	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Weight lossb. Neurologic disturbances2. Physical exam with attn. to<ol style="list-style-type: none">a. Skinb. Eyesc. Nervous system	At least annually. Same as in A.	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Acrylonitrile
(1910.1045)
(Vinyl cyanide)

A. PREPLACEMENT or BASELINE	B. PERIODIC	
1. Work and medical histories, with attn. to	Annually. Same as in A. (except chest X-ray).	Cancer hazard (suspect)
a. Skin		1. Requirements apply to all workers exposed at or above 1 ppm as an
b. Respiratory system		8-hr. time-weighted average.
c. Gastrointestinal system		2. After acute over-exposure, perform urinary total phenol.
2. Physical exam with attn. to cardiovascular system		
a. Complete blood count (CBC) and differential		
b. Urinalysis with microscopic		
c. 14" x 17" post/ant chest X-ray		
d. Fecal occult blood screening		

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Allyl chloride

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Medical and work histories, with attn. to
a. Respiratory system
b. Liver
c. Kidneys
d. Skin
e. Eyes | Annually. Same as in A. (except chest X-ray). |
| 2. Physical exam | |
| 3. Clinical laboratory studies
a. CBC and differential
b. Urinalysis with microscopic
c. 14" x 17" post/ant chest X-ray | |
| d. Pulmonary function (forced vital capacity (FVC) and forced expiratory volume (1 second) (FEV ₁)) | |
| e. Liver profile (including serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvic transaminase (SGPT)) | |

4-Aminodiphenyl
(1910.1011)

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------|
| 1. Physical exam with attn. to
a. Deficient immuno-competence
b. Treatment with steroids or cytotoxics
c. Pregnancy | At least annually. Same as in A. | Cancer hazard. Requirements apply to all workers entering a regulated area. |
| 2. Personal, family, and occupational histories, including
a. Genetic factors
b. Environmental factors
c. Cigarette smoking | | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Ammonia

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|--------------------------------|--------------------------|
| 1. Medical and work histories | Annually. Same as in |
| 2. Physical exam with attn. to | A. (except chest X-ray). |
| a. Eyes | |
| b. Skin | |
| c. Upper respiratory system | |
| 3. Clinical laboratory studies | |
| a. 14" x 17" post/ant | |
| chest X-ray | |
| b. Pulmonary function | |
| (FVC and FEV ₁) | |

Antimony

- | | |
|--------------------------------|--------------------------|
| 1. Medical and work histories | Annually. Same as in |
| with attn. to | A. (except chest X-ray). |
| a. Skin | |
| b. Mucous membrane | |
| c. Respiratory system | |
| d. Cardiac system | |
| 2. Physical exam | |
| 3. Clinical laboratory studies | |
| a. 14" x 17" post/ant | |
| chest X-ray | |
| b. Pulmonary function | |
| (FVC and FEV ₁) | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Arsenic (inorganic)
(1910.1018)

A. PREPLACEMENT or BASELINE B. PERIODIC

1. Medical and work histories, including a smoking history and presence and degree of respiratory symptoms, such as shortness of breath, cough, sputum production, and wheezing.
2. Physical exam
3. Clinical laboratory studies
 - a. CBC and differential
 - b. Urinalysis with microscopic
 - c. 14" x 17" post/ant chest X-ray

- Cancer hazard (suspect)
1. Baseline requirements
 - a. Those who are or will be exposed to arsenic at or above 5 ug/m3.
 - b. Those who were previously exposed as in 1.a for 10 yrs. or more.
 - c. Those developing symptoms associated with exposure.
 2. Annual surveillance requirement for those less than 45 years old, with less than 10 yrs. exposure; semiannual surveillance requirement for all other covered workers.
 3. Medical surveillance required prior to termination of employment. Same as in A.2. and 3.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	Requirements apply to
Asbestos (1910.1001)		Same as in A.	1. Workers currently exposed to airborne concentration of
	1. Comprehensive medical and work histories to elicit symptomatology of respiratory disease and any past exposure to asbestos.	1. For those currently exposed at or above the action level or ceiling:	a. 0.5 fibers/cc for any length of time on a regular basis (action level) Note: For a definition of regular basis, see 2.a., below.
	2. Physical exam		
	3. Clinical laboratory studies		
	a. 14" x 17" post/ant chest X-ray within 30 days of placement on job.	2. For those not currently exposed per B.1 but whose previous exposures did meet the B.1. criteria:	b. In excess of 10 fibers/cc for any time (ceiling). Workers not currently exposed, but whose previous exposures can be reasonably estimated to have exceeded
	b. Pulmonary function (FVC and FEV ₁)	a. And who are less than 36 yrs. old: every 5 yrs.	a. The action level for 15 days in any one quarter of 45 days in any one calendar year; or
		b. And who are 36 yrs. old or older: annually.	b. The ceiling value at any time.
		3. For workers in B.1 or B.2., above, who show signs or symptoms of any asbestos-related disorder: annually.	
		4. For personnel in B.1., B.2., or B.3., above, upon termination of employment: + 30 days of termination date, if not examined within the last year.	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE	B. PERIODIC	
<p>Benzene (1910.1028)</p>		
1. Physical exam	At least semiannually	Cancer hazard (suspect)
2. Clinical laboratory studies	1. Interim personal and work history.	1. Requirements apply to workers exposed at or above 5 ppm (averaged over an 8-hour workday).
a. Complete blood count, including	2. Physical exam sufficient to rule out changes related to symptoms of benzene toxicity.	2. After acute overexposure, perform urinary total phenol test. If 75 mg per liter, perform tests same as A.2. and repeat in 1 mo. Refer any abnormal cases for hematology consult.
(1) Hemoglobin and mean corpuscular volume	3. Urinary total phenol.	
(2) White blood cell and differential count		
(3) Platelet estimation		
(4) Reticulocyte count		
b. Serum bilirubin		
c. Urinary total phenol		
3. Detailed work history of all known past exposure to		
a. Benzene, alone and in formulations (such as volatile solvents and intermediates)		
b. Other myelotoxic chemicals, drugs, or other agents (such as ionizing radiation)		
c. Other diseases of the blood (such as leukemia)		
4. Family history of blood dyscrasias, including leukemia		
5. Family history, including		
a. All illnesses involving systemic dysfunctions		
b. Use of alcohol		
c. Smoking history		

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Benzidine (1910.1010) (4,4'-Diaminobiphenyl)	1. Physical exam with attn. to a. Decreased immuno-competence b. Pregnancy	At least annually 1. Same as in A. 2. Cystoscopy.	Cancer hazard. Requirements apply to all workers entering a regulated area.
	2. Personal, family, and occupational histories, including a. Genetic factors b. Environmental factors c. Treatment with steroid or cytotoxic agents d. Cigarette smoking		
Benzoyl peroxide	1. Medical and work histories with attn. to a. Skin b. Respiratory system	Annually. Same as in A. (except chest X-ray).	
	2. Physical exam with attn. to a. Skin b. Eyes c. Upper respiratory irritation (cough)		
	3. Clinical laboratory studies a. 14" x 17" post/ant chest X-ray b. Pulmonary function (FVC and FEV ₁)		

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Benzyl chloride

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Medical and work histories with attn. to:
a. Respiratory system
b. Skin
c. Eyes | Annually. Same as in A. (except chest X-ray). |
| 2. Physical exam with attn. to
a. Respiratory system
b. Skin
c. Eyes | |
| 3. Clinical laboratory studies
a. 14" x 17" post/ant chest X-ray
b. Pulmonary function (FVC and FEV ₁) | |

Beryllium

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1. Medical and work histories | Annually. Same as in |
| 2. Physical exam with attn. to respiratory system | A. (except chest X-ray). |
| 3. Clinical laboratory studies
a. CBC and differential
b. Urinalysis with microscopic
c. 14" x 17" post/ant chest X-ray
d. Pulmonary function (FVC and FEV ₁) | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Boron trifluoride	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam with attn. to respiratory system3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).	
2-Butanone (Methyl ethyl ketone)	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Kidney diseaseb. Liver diseasec. Chronic respiratory diseased. Skin disease2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Liver profile (including SGOT and SGPT)	Annually. Same as in A. (except chest X-ray).	

CHEMICAL AGENTMEDICAL SURVEILLANCE PROCEDURESCOMMENTS**Cadmium**

A. PREPLACEMENT or BASELINE	B. PERIODIC
1. Medical and work histories	Annually
2. Physical exam	1. Same as in A.
3. Clinical laboratory studies	(except chest X-ray).
a. Urinalysis with microscopic	2. Palpation of prostate
b. 14" x 17" post/ant chest x-ray	for male workers
c. Pulmonary function (FVC and FEV ₁)	40 yrs. old and older.
d. Kidney function (Blood urea nitrogen (BUN) and serum creatinine)	

**Carbaryl
(Sevin; 1-Naphthyl-N-methyl-carbamate)**

1. Medical and work histories with attn. to	Annually. Same as in A. (except erythrocyte cholinesterase activity).
a. Frequent headaches, dizziness, tightness in chest, dimness of vision, and difficulty in focusing eyes	
b. Glaucoma	
c. Cardiovascular disease	
d. Hepatic disease	
e. Renal disease	
f. Central nervous system (CNS) disease	
g. Use of anticholinergic drugs	
2. Physical exam	
3. Clinical laboratory studies	
a. CBC and differential	
b. 14" x 17" post/ant chest X-ray	
c. Erythrocyte cholinesterase activity	
d. Pulmonary function (FVC and FEV ₁)	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Carbon black

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|---------------------------------------------------------------------------------------------|----------------------------------|
| 1. Medical and work histories with attn. to | Annually. Same as in |
| a. Respiratory system | A. (except chest X-ray and ECG). |
| b. Heart | |
| c. Skin | |
| d. Previous exposures to potential respiratory and skin irritants and pulmonary carcinogens | |
| e. Smoking and tobacco histories | |
| 2. Physical exam with attn. to | |
| a. Upper and lower respiratory tract | |
| b. Heart | |
| c. Skin | |
| d. Mucous membranes of the oral cavity | |
| e. Any pretumorous and tumorous lesions on the skin and membranes | |
| 3. Clinical laboratory studies | |
| a. 14" x 17" post/ant chest X-ray | |
| b. Pulmonary function (FVC and FEV ₁) | |
| c. Electrocardiogram (ECG) | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Carbon disulfide	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Cardiovascular systemb. Reproductive systemc. Nervous systemd. Medicine being taken2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. 14" x 17" post/ant chest X-rayb. Pulmonary functionc. ECGd. Liver profilee. Special visual tests (including fields)	<p>Annually</p> <ol style="list-style-type: none">1. Medical and work histories with special attn. to behavioral and psychological changes.2. Same as in A.3. (except chest X-ray).	
Carbon monoxide	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Cardiovascular system (angina)b. Cigarette smoking	<p>Annually. Same as in A.</p>	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE B. PERIODIC

Carbon tetrachloride

1. Medical and work histories with attn. to
 - a. Nausea, vomiting, and visual disturbances
 - b. Use of alcohol and barbituates
2. Physical exam
3. Clinical laboratory studies
 - a. CBC and Jifferential
 - b. Urinalysis with microscopic
 - c. Liver profile (including SGOT and SGPT)
 - d. Special visual tests (including fields)
 - e. 14" x 17" post/ant chest X-ray

Annually. Same as in A. (except chest X-ray).

Chlorine

1. Medical and work histories with attn. to
 - a. Cardiovascular system
 - b. Respiratory system
2. Physical exam
3. Clinical laboratory studies
 - a. 14" x 17" post/ant chest X-ray
 - b. Pulmonary function (FVC and FEV₁)

Annually. Same as in A. (except chest X-ray).

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Chloroform (Trichloromethane)	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Gastrointestinal systemb. Nervous systemc. Alcohol consumption2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. Liver profile (including SGOT and SGPT)d. ECGe. 14" x 17" post/ant chest X-ray	Annually. Same as in A. (except chest X-ray).	
bis-Chloromethyl ether (1910.1008)	<ol style="list-style-type: none">1. Physical exam with attn. to<ol style="list-style-type: none">a. Deficient immunocompetenceb. Treatment with steroids or cytotoxicsc. Pregnancy2. Personal, family, and occupational histories, including<ol style="list-style-type: none">a. Genetic factorsb. Environmental factorsc. Cigarette smoking	At least annually. Same as in A.	Cancer hazard. Requirements apply to all workers entering a regulated area.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE	B. PERIODIC
b-Chloroprene (2-Chloro-1, 3-butadiene)	
1. Medical and work histories with attn. to	Annually. Same as in A. (except chest X-ray).
a. Skin	
b. Eyes	
c. Nervous system	
d. Hepatic system	
e. Pulmonary system	
f. Renal system	
2. Physical exam with attn. to	
a. Skin	
b. Eyes	
c. CNS function	
3. Clinical laboratory studies	
a. CBC and differential	
b. Urinalysis with microscopic	
c. 14" x 17" post/ant chest X-ray	
d. Pulmonary function (FVC and FEV ₁)	
e. Liver profile (including SGOT and SGPT)	
f. ECG	
g. Kidney function (BUN and serum creatinine)	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

- | | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|--------------------------------|--------------------------------------------------------------------------|--------------------------|
| Chromic acid and Chromium (VI) | | |
| | 1. Medical and work histories with attn. to | Annually. Same as in |
| | a. All exposures to chromic acid and other hexavalent chromium compounds | A. (except chest X-ray). |
| | b. Skin | |
| | c. Respiratory system | |
| | d. Nasal septum (bleeding or perforation) | |
| | 2. Physical exam with attn. to | |
| | a. Skin (chrome holes) | |
| | b. Nasal septum | |
| | 3. Clinical laboratory studies | |
| | a. CBC and differential | |
| | b. Urinalysis with microscopic | |
| | c. 14" x 17" post/ant chest X-ray | |
| | d. Pulmonary function (FVC and FEV ₁) | |

CHEMICAL AGENT

Cresol
(Cresylic acid, mixed
o, m, p isomers)

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Medical and work histories with attn. to <ul style="list-style-type: none">a. Lungsb. Liverc. Kidneysd. Pancrease. Nervous systemf. Cardiovascular systemg. Skin | Annually. Same as in A. (except chest X-ray). |
| 2. Physical exam | |
| 3. Clinical laboratory studies <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)e. Liver profile (including SGOT and SGPT)f. Kidney function (BUN and serum creatinine) | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Cyclohexanone

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. Medical and work histories with attn. to <ul style="list-style-type: none">a. Kidney diseaseb. Liver diseasec. Chronic respiratory diseased. Skin disease | Annually. Same as in A. |
| 2. Physical exam | |
| 3. Clinical laboratory studies <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Liver profilee. Kidney function (BUN and serum creatinine) | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE	B. PERIODIC	
1,2-Dibromo-3-Chloropropane (DBCP) (1910.1044)	1. Medical and work histories (including reproductive history) 2. Physical exam with attn. to genitourinary tract, testicle size, and body habitus 3. Clinical laboratory studies a. Serum follicle stimulating hormone (FSH) and luteinizing hormone (LH); total estrogen (for women) b. Sperm count (for men)	Cancer (suspect) and sterility hazard. Requirements apply to all workers entering a regulated area (where concentrations exceed 1 ppb as an 8-hr. time-weighted average).
3,3'-Dichlorobenzidine (and its salts) (1910.1007)	1. Physical exam with attn. to a. Deficient immunocompetence b. Pregnancy c. Treatment with steroid or cytotoxics 2. Personal, family, and occupational histories, including a. Genetic factors b. Environmental factors c. Cigarette smoking	Cancer hazard (suspect). Requirements apply to all workers entering a regulated area.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

4-Dimethylaminoazobenzene
(1910.1015)

A. PREPLACEMENT or BASELINE	B. PERIODIC	
<ol style="list-style-type: none">1. Physical exam with attn. to<ol style="list-style-type: none">a. Deficient immuno-competenceb. Pregnancy2. Personal, family, and occupational histories, including<ol style="list-style-type: none">a. Genetic factorsb. Environmental factorsc. Treatment with steroids or cytotoxicsd. Cigarette smoking	<p>At least annually Same as in A.</p>	<p>Cancer hazard (suspect). Requirements apply to all workers entering a regulated area.</p>

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Dinitro-ortho-cresol

A.	PREPLACEMENT or BASELINE	B. PERIODIC	COMMENTS
	Medical and work histories	Annually.	Same as in A.
1.	Physical exam with attn. to		
2.	a. Skin and hair discoloration (yellow-brown)		
	b. Lips, nose, and earlobes (cyanosis)		
	c. Eyes and throat (irritation)		
	d. Nervous system (somnolence and ataxia)		
3.	Clinical laboratory studies		
	a. CBC and differential		
	b. Blood methemoglobin level (if cyanotic)		
	c. Urinalysis with microscopic		
	d. Urine p-nitrophenol (if darkening observed)		
	e. Liver profile (including SGOT and SGPT)		
	f. Altered metabolism (including fever and tachycardia)		

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC
Dioxane (1,4-Diethylene dioxide)	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Upper respiratory systemb. Hepatic functionc. Renal function2. Physical exam with attn. to skin and mucosa3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. Liver profile (including SGOT and SGPT)d. Kidney function (BUN and serum creatinine)	Annually. Same as in A.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Epichlorohydrin (1-Chloro-2, 3-epoxypropane)	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Liver profile (including SGPT, SGOT and lactate dehydrogenase (LDH)	Annually. Same as in A. (except chest X-ray).	
Ethyl butyl ketone (3-Heptanone)	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Chronic respiratory diseaseb. Skin disease3. Physical exam<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-ray	Annually. Same as in A. (except chest X-ray).	

CHEMICAL AGENT

Ethylene dibromide
(1,2-Dibromoethane)

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE	B. PERIODIC	COMMENTS
1. Medical and work histories	At least annually.	Cancer hazard. Requirements
2. Physical exam with attn. to	Same as in A. (except chest X-ray).	apply to all workers entering
a. Respiratory system		a regulated area.
b. Liver		
c. Kidneys		
d. Skin		
3. Clinical laboratory studies		
a. CBC and differential		
b. Urinalysis with microscopic		
c. 14" x 17" post/ant chest X-ray		
d. Pulmonary function (FVC and FEV ₁)		
e. Liver profile (including SGOT and SGPT)		
f. Kidney function (BUN and serum creatinine)		

COMMENTS

MEDICAL SURVEILLANCE PROCEDURES

CHEMICAL AGENT

A. PREPLACEMENT or BASELINE B. PERIODIC

1. Medical and work histories with attn. to Annually. Same as in A. (except chest X-ray).

- a. Respiratory system
- b. Cardiovascular system
- c. Hepatic function
- d. Renal function

2. Physical exam

3. Clinical laboratory studies

- a. CBC and differential
- b. Urinalysis with microscopic
- c. 14" x 17" post/ant chest X-ray
- d. Pulmonary function (FVC and FEV₁)
- e. Liver profile (including SGOT and SGPT)
- f. Kidney function (BUN and serum creatinine)

Ethylene dichloride
(1,2-Dichloroethane)

1. Medical and work histories with attn. to cardiovascular system Annually. Same as in A. (except chest X-ray).

2. Physical exam

3. Clinical laboratory studies

- a. CBC and differential
- b. Urinalysis with microscopic
- c. ECG
- d. 14" x 17" post/ant chest X-ray

Ethylene glycol
dinitrate

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Ethyleneimine
(1910.1012)

- | | A. PREPLACEMENT or BASELINE | B. PERIODIC | |
|--|--------------------------------|-----------------------|---------------------------|
| | 1. Physical exam with attn. to | At least annually. | Cancer hazard (suspect). |
| | a. Decreased immunocompe- | Same as in A. (except | Requirements apply to all |
| | tence | chest X-ray). | all workers entering a |
| | b. Pregnancy | | regulated area. |
| | c. Treatment with steroids | | |
| | or cytotoxic agent | | |
| | 2. Personal, family, and | | |
| | occupational histories, | | |
| | including | | |
| | a. Genetic factors | | |
| | b. Environmental factors | | |
| | c. Cigarette smoking | | |

Ethylene oxide

- | | | |
|--------------------------------|--------------------|--------------------------|
| 1. Medical and work histories, | At least annually. | Cancer hazard (suspect). |
| including reproductive | Same as in A. | Requirements apply to |
| history with attn. to | (except chest | all workers exposed |
| a. Eyes | X-ray). | at or above 2.5 ppm. |
| b. Blood | | |
| c. Lungs | | |
| d. Liver | | |
| e. Kidney | | |
| f. Nervous system | | |
| g. Skin | | |
| 2. Physical exam | | |
| 3. Clinical laboratory studies | | |
| a. CBC and differential | | |
| b. Urinalysis with microscopic | | |
| c. 14" x 17" post/ant | | |
| chest X-ray | | |
| d. Liver profile | | |
| (including SGOT and SGPT) | | |
| e. Pulmonary function | | |
| (FVC and FEV ₁) | | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC
Fibrous glass	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Prior exposure to dusty occupation (silica, coal dust and asbestos)b. Respiratory systemc. Atopyd. Skine. Eyes (inflammation)2. Physical exam with attn. to<ol style="list-style-type: none">a. Skin (dermatitis and dermatographism)b. Respiratory systemc. Eyes (conjunctivitis)3. Clinical laboratory studies<ol style="list-style-type: none">a. 14" x 17" post/ant chest X-rayb. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).
Fluorides (inorganic)	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. Urine fluoride analysisd. X-ray of pelvis (to show sacrospinous ligaments)e. 14" x 17" post/ant chest X-ray	Annually. Same as in A. (except chest and pelvic X-ray).

<u>CHEMICAL AGENT</u>	<u>MEDICAL SURVEILLANCE PROCEDURES</u>		<u>COMMENTS</u>
Formaldehyde	A. PREPLACEMENT or BASELINE	B. PERIODIC	
	1. Medical and work histories with attn. to hypersensitivities or other allergies, such as asthma or hay fever.	At least annually. Same as in A. (except chest X-ray).	Cancer hazard (suspect). Requirements apply to all workers exposed at or above 1 ppm.
	2. Physical exam with attn. to <ol style="list-style-type: none"> Eyes Chronic inflammatory reaction of respiratory tract Chronic inflammatory reaction of skin 		
	3. Clinical laboratory studies <ol style="list-style-type: none"> CBC and differential Urinalysis with microscopic 14" x 17" post/ant chest X-ray Pulmonary function (FVC and FEV₁) 		

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

- | | A. PREPLACEMENT or BASELINE | B. PERIODIC | |
|--------------------------|--------------------------------|-------------------------|--|
| Glycidyl ethers | | | |
| (2,3-epoxypropyl ethers) | | | |
| | 1. Medical and work histories | Annually. Same as in A. | |
| | 2. Physical exam with attn. to | (except chest X-ray). | |
| | a. Skin | | |
| | b. Eyes | | |
| | c. Mucous membranes | | |
| | 3. Clinical laboratory studies | | |
| | a. CBC and differential | | |
| | b. Urinalysis with microscopic | | |
| | c. 14" x 17" post/ant | | |
| | chest X-ray | | |
| | d. Pulmonary function | | |
| | (FVC and FEV ₁) | | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Hexone (Methyl isobutyl ketone)	<p>1. Medical and work histories with attn. to</p> <ul style="list-style-type: none">a. Kidney diseaseb. Liver diseasec. Chronic respiratory diseased. Skin disease <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Liver profile (including SGOT and SGPT)e. Kidney function (BUN and serum creatinine)	<p>Annually. Same as in A. (except chest X-ray)..</p>	
Hydrazines	<p>1. Medical and work histories</p> <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Liver profile (including SGOT and SGPT)	<p>At least annually Same as in A. (except chest X-ray).</p>	<p>Cancer hazard (suspect). Requirements apply to all workers exposed at or above 0.05 ppm.</p>

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Hydrogen cyanide and cyanide salts	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Skin disordersb. Nonspecific symptoms such as headache, nausea, vomiting, dizziness, and weakness2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. Pulmonary function (FVC and FEV₁)	Annually. Same as in A.	
Hydrogen fluoride	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Exposure to hydrogen fluoride and inorganic fluoridesb. Respiratory diseases2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	At least annually. Same as in A. (except chest X-ray).	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Hydrogen sulfide

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Medical and work histories with attn. to
a. Eyes
b. Respiratory system
2. Physical exam
3. Clinical laboratory studies:
a. 14" x 17" post/ant chest X-ray
b. Pulmonary function (FVC and FEV ₁) | Annually. Same as in A. (except chest X-ray). |

Hydroquinone
(Dihydroxybenzene)

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. Medical and work histories with attn. to
a. Eyes (conjunctivitis)
b. Skin
2. Physical exam
3. a. CBC and differential
b. Urinalysis with microscopic
c. Urine hydroquinone level (if dark brown) | Annually. Same as in A. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|

CHEMICAL AGENT

Isopropyl alcohol

MEDICAL SURVEILLANCE PROCEDURES

A. PREPLACEMENT or BASELINE B. PERIODIC

1. Medical and work histories Annually. Same as in A.
2. Physical exam with attn. to (except chest X-ray).
 - a. Skin
 - b. Sinuses
 - c. Respiratory system
3. Clinical laboratory studies
 - a. CBC and differential
 - b. Urinalysis with microscopic
 - c. 14" x 17" post/ant chest X-ray
 - d. Pulmonary function (FVC and FEV₁)

COMMENTS

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Lead (inorganic)
29 CFR 1910.1025

A. PREPLACEMENT or BASELINE	B. PERIODIC	COMMENTS
1. Personal history, including a. All illnesses involving systemic dysfunctions b. Use of alcohol (especially "moonshine") c. Smoking 2. Detailed work history of all known past exposure to lead (such as lead painting or burning) on or off the job. 3. Physical exam with attn. to a. Evidence of lead line of gums b. Anemic pallor c. Deficient strength of handshake or grip d. Pregnancy in women e. Abdominal pain f. Palsy (wrist or ankle drop) 4. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. Whole blood lead concentrations d. Kidney function (BUN and serum creatinine) e. 14" 17" post/ant chest X-ray	At least annually. Same as in A. (except chest X-ray).	Requirements apply to all workers ₃ exposed at or above 30 ug/m as average, for more than 30 days per year.

COMMENTS

MEDICAL SURVEILLANCE PROCEDURES

CHEMICAL AGENT

A. PREPLACEMENT or BASELINE B. PERIODIC

Malathion

1. Medical and work histories with attn. to
Frequent headache, dizziness
nausea, tightness of chest,
dimness of vision, and difficulty
in focusing eyes
 2. Physical exam
 3. Clinical laboratory studies
Erythrocyte cholinesterase
activity.
- Annually. Same as in
A.1 and 2.

Mercury (inorganic)

1. Medical and work histories with attn. to
 - a. Loss of weight
 - b. Sleeplessness
 - c. Tremors
 - d. Personality changes
 - e. CNS involvement (such as
changes in handwriting)
 2. Physical exam
 3. Clinical laboratory studies
 - a. CBC and differential
 - b. Urinalysis with microscopic
 - c. Urine mercury
 - d. Kidney function
(BUN and serum creatinine)
- Annually. Same as in A.

<u>CHEMICAL AGENT</u>	<u>MEDICAL SURVEILLANCE PROCEDURES</u>		<u>COMMENTS</u>
	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Methyl alcohol	1. Medical and work histories 2. Physical exam, including ophthalmologic 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic	Annually. Same as in A.	
Methylene chloride (Dichloromethane)	1. Medical and work histories with attn. to a. Headache, dizziness, and fatigue b. Pain in limbs c. Skin and eye irritation 2. Physical exam 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. 14" x 17" post/ant chest X-ray d. Pulmonary function (FVC and FEV ₁)	Annually. Same as in A. (except chest X-ray).	

<u>CHEMICAL AGENT</u>	<u>MEDICAL SURVEILLANCE PROCEDURES</u>		<u>COMMENTS</u>
	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Methyl chloromethyl ether (1910.1006)	1. Physical exam with attn. to a. Deficient immunocompetence b. Pregnancy 2. Personal, family, and occupational histories, including a. Genetic factors b. Environmental factors c. Treatment with steroids or cytotoxics d. Cigarette smoking	At least annually. Same as in A.	Cancer hazard. Requirements apply to all workers entering a regulated area.
Methyl (n-amyl) ketone (2-heptanone)	1. Medical and work histories with attn. to a. Chronic respiratory disease b. Skin disease 2. Physical exam 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. 14" x 17" post/ant chest X-ray d. Pulmonary function (FVC and FEV ₁)	Annually. Same as in A. (except chest X-ray).	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Methyl parathion

A. PREPLACEMENT or BASELINE	B. PERIODIC	
<p>1. Medical and work histories with attn. to</p> <ul style="list-style-type: none">a. Frequent headaches, dizziness, nausea, tightness of chest, dimness of vision, and difficulty in focusing eyesb. Dermatitis <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. Erythrocyte cholinesterase activity	<p>Annually. Same as in A.</p>	
<p>1. Medical and work histories with attn. to</p> <ul style="list-style-type: none">a. Exposure to known carcinogensb. Alcohol and smoking habitsc. Use of medications <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	<p>At least annually. Same as in A. (except chest X-ray).</p>	<p>Cancer hazard (suspect). Requirements apply to all workers exposed at or above 0.01 ppm.</p>

4,4'-Methylene bis
(2-chloroaniline)
(MOCA)

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
a-Naphthylamine (1910.1004) (1-Aminonaphthalene)	<ol style="list-style-type: none">1. Physical exam with attn. to<ol style="list-style-type: none">a. Reduced immuno-competenceb. Pregnancy2. Personal, family, and occupational histories, including<ol style="list-style-type: none">a. Genetic factorsb. Environmental factorsc. Steroid or cytotoxic treatmentsd. Cigarette smoking	At least annually. Same as in A.	Cancer hazard. Requirements apply to all workers entering a regulated area.
b-Naphthylamine (1910.1009) (2-Aminonaphthalene)	<ol style="list-style-type: none">1. Physical exam with attn. to<ol style="list-style-type: none">a. Reduced immunocompetenceb. Pregnancy2. Personal, family, and occupational histories, including<ol style="list-style-type: none">a. Genetic factorsb. Environmental factorsc. Steroid or cytotoxic treatmentsd. Cigarette smoking	At least annually. Same as in A.	Cancer hazard. Requirements apply to all workers entering a regulated area.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Nickel carbonyl	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Lungsb. Upper respiratory tract3. Physical exam<ol style="list-style-type: none">a. Pulmonary function (FVC and FEV₁)b. Urinary nickel contentc. 14" x 17" post/ant chest X-ray	At least annually Same as in A. (except chest X-ray).	Cancer hazard (suspect). Requirements apply to all workers entering a regulated area.
Nickel (inorganic)	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Skin conditions or allergies (atopy)b. Respiratory systemc. Cigarette smoking2. Physical exam with attn. to<ol style="list-style-type: none">a. Upper respiratory tractb. Skin3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Nitric acid	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).	
4-Nitrobiphenyl (1910.1003)	<ol style="list-style-type: none">1. Physical exam with attn. to<ol style="list-style-type: none">a. Deficient immunocompetenceb. Pregnancy2. Personal, family, and occupational histories, including<ol style="list-style-type: none">a. Genetic factorsb. Environmental factorsc. Steroid or cytotoxic treatmentsd. Cigarette smoking	At least annually. Same as in A.	Cancer hazard. Requirements apply to all workers entering a regulated area.
Nitrogen oxides	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. 14" x 17" post/ant chest X-rayb. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Nitroglycerin	1. Medical and work histories with attn. to cardiovascular system 2. Physical exam 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. ECG d. 14" x 17" post/ant chest X-ray	Annually. Same as in A. (except chest X-ray).	
N-Nitroso-dimethylamine (1910.1016) (Dimethylnitrosamine)	1. Physical exam with attn. to deficient immunocompetence 2. Personal, family, and occupational histories, including a. Genetic factors b. Environmental factors c. Treatment with steroids or cytotoxic agents d. Cigarette smoking	At least annually. Same as in A.	Cancer hazard (suspect). Requirements apply to all workers entering a regulated area.

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

- | | <u>A. PREPLACEMENT or BASELINE</u> | <u>B. PERIODIC</u> |
|-----------------------|------------------------------------|-------------------------|
| Organic tin compounds | | |
| | 1. Medical and work histories | Annually. Same as in A. |
| | 2. Physical exam with attn. to | (except chest X-ray). |
| | a. Skin | |
| | b. Upper respiratory tract | |
| | 3. Clinical laboratory studies | |
| | a. CBC and differential | |
| | b. Urinalysis with microscopic | |
| | c. 14" x 17" post/ant | |
| | chest X-ray | |
| | d. Pulmonary function | |
| | (FVC and FEV ₁) | |

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Parathion	1. Medical and work histories 2. Physical exam 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. Erythrocyte cholinesterase activity	Annually. Same as in A.	
2-Pentanone (Methyl Propyl Ketone)	1. Medical and work histories with attn. to skin disease 2. Physical exam	Annually. Same as in A.	
Phenol (Hydroxybenzene)	1. Medical and work histories with attn. to a. Skin b. Respiratory tract c. Liver d. Kidneys 2. Physical exam 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. Kidney function (BUN and serum creatinine) d. Liver profile (including SGOT and SGPT)	At least annually. Same as in A.	

COMMENTS

MEDICAL SURVEILLANCE PROCEDURES

CHEMICAL AGENT

A. PREPLACEMENT or BASELINE B. PERIODIC

- | | | |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Phosgene
(Carbonyl chloride) | 1. Medical and work histories with attn. to
a. Respiratory systems
b. Eyes
c. Skin
2. Physical exam
3. Clinical laboratory studies
a. 14" x 17" post/ant chest X-ray
b. Pulmonary function (FVC and FEV ₁) | Annually. Same as in A. |
| Polychlorinated biphenyls | 1. Medical and work histories with attn. to
a. Liver
b. Skin
2. Physical exam
3. Clinical laboratory studies
a. CBC and differential
b. Urinalysis with microscopic
c. Liver profile (including SGOT and SGPT) | Annually. Same as in A. |

<u>CHEMICAL AGENT</u>	<u>MEDICAL SURVEILLANCE PROCEDURES</u>		<u>COMMENTS</u>
	A. PREPLACEMENT or BASELINE	B. PERIODIC	
b-Propiolactone (1910.1013)	1. Physical exam with attn. to a. Deficient immuno-competence b. Pregnancy 2. Personal, family, and occupational histories, including: a. Genetic factors b. Environmental factors c. Steroid and cytotoxic treatments d. Cigarette smoking	At least annually. Same as in A.	Cancer hazard (suspect). Requirements apply to all workers entering a regulated area.
Silica (crystalline)	1. Medical and work histories with attn. to a. All previous exposure to free silica b. Respiratory system 2. Physical exam 3. Clinical laboratory studies a. CBC and differential b. Urinalysis with microscopic c. 14" x 17" post/ant chest X-ray d. Pulmonary function (FVC and FEV ₁)	Annually. Same as in A.	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
Sodium hydroxide	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam with attn. to<ol style="list-style-type: none">a. Skinb. Eyesc. Upper respiratory tract3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).	
Sulfur dioxide and Sulfuric acid	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam with attn. to<ol style="list-style-type: none">a. Teethb. Eyesc. Skin3. Clinical laboratory studies<ol style="list-style-type: none">a. Pulmonary function (FVC and FEV₁)b. 14" x 17" post/ant chest X-ray	Annually. Same as in A.	

<u>CHEMICAL AGENT</u>	<u>MEDICAL SURVEILLANCE PROCEDURES</u>		<u>COMMENTS</u>
	A. PREPLACEMENT or BASELINE	B. PERIODIC	
1,1,2,2-Tetrachloroethane (Acetylene tetrachloride)	1. Medical and work histories with attn. to <ol style="list-style-type: none"> Liver Kidney 2. Physical exam with attn. to nervous system (tremor) 3. Clinical laboratory studies <ol style="list-style-type: none"> CBC and differential Urinalysis with microscopic Liver profile (including SGOT and SGPT) Kidney function (BUN and serum creatinine) 	Annually. Same as in A.	
Tetrachloroethylene (Perchloroethylene)	1. Medical and work histories 2. Physical exam with attn. to <ol style="list-style-type: none"> Nervous system (incoordination) Liver Skin 3. Clinical laboratory studies <ol style="list-style-type: none"> CBC and differential Urinalysis with microscopic Liver profile (including SGOT and SGPT) 	Annually. Same as in A.	

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	
o-Tolidine (3,3'-Dimethylbenzidine)	1. Medical and work histories	At least annually.	Cancer hazard (suspect). Requirements apply to all workers entering a regu- lated area.
	2. Physical exam	Same as in A.	
	3. Clinical laboratory studies	(except chest	
	a. CBC and differential	X-ray and ECG).	
Toluene	b. Urinalysis with micro- scopic		
	c. 14" x 17" post/ant chest X-ray		
	d. ECG		
	1. Medical and work histories with attn. to	Annually. Same as in A.	
	a. Headache, nausea, and dizziness		
	b. Liver disease		
	c. Kidney disease		
	2. Physical exam with attn. to		
	a. Eyes		
	b. Mucous membranes		
	c. Skin		
	d. Nervous system (nervousness)		
	3. Clinical laboratory studies		
	a. CBC and differential		
	b. Urinalysis with microscopic		
	c. Kidney function (BUN and serum creatinine)		
	d. Liver profile (including SGOT and SGPT)		

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

	A. PREPLACEMENT or BASELINE	B. PERIODIC	COMMENTS
Toluene-2,4-diisocyanate (TDI)	<ol style="list-style-type: none">1. Medical and work histories with attn. to<ol style="list-style-type: none">a. Respiratory systemb. Previous sensitization to TDIc. Atopyd. Skin2. Physical exam3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC with differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	Annually. Same as in A. (except chest X-ray).	Requirements in A. and B. are applicable to all organic isocyanates.
1,1,1-Trichloroethane (Methyl Chloroform)	<ol style="list-style-type: none">1. Medical and work histories2. Physical exam with attn. to<ol style="list-style-type: none">a. Nervous systemb. Cardiovascular systemc. Liverd. Skin3. Clinical laboratory studies<ol style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Liver profile (including SGOT and SGPT)	Annually. Same as in A. (except chest X-ray).	

COMMENTS

MEDICAL SURVEILLANCE PROCEDURES

CHEMICAL AGENT

	A. PREPLACEMENT or BASELINE	B. PERIODIC
1,1,1,-Trichloroethylene	<p>1. Medical and work histories with attn. to</p> <p>a. Respiratory system</p> <p>b. Cardiovascular system</p> <p>c. Liver</p> <p>d. Kidney</p> <p>e. Skin</p> <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <p>a. CBC and differential</p> <p>b. Urinalysis with microscopic</p> <p>c. 14" x 17" post/ant chest X-ray</p> <p>d. Pulmonary function (FVC and FEV₁)</p> <p>e. Liver profile (including SGOT and SGPT)</p> <p>f. Kidney function (BUN and serum creatinine)</p>	<p>At least annually. Same as in A. (except chest X-ray).</p>
Tungsten and cemented tungsten carbide	<p>1. Medical and work histories</p> <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <p>a. 14" x 17" post/ant chest X-ray</p> <p>b. Pulmonary function (FVC and FEV₁)</p>	<p>Annually. Same as in A. (except chest X-ray).</p>

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE	B. PERIODIC
<p>1. Medical and work histories with attn. to</p> <ul style="list-style-type: none">a. Eye (irritation)b. Respiratory systemc. Atopyd. Skin <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)	<p>Annually. Same as in A. (except chest X-ray).</p>

Vanadium

Vinyl acetate

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

A. PREPLACEMENT or BASELINE	B. PERIODIC	
<p>1. Medical and work histories with attn. to</p> <ul style="list-style-type: none">a. Alcohol intakeb. Past history of hepatitisc. Blood transfusions and hospitalizationd. Past exposure to potential hepatotoxic agents (including drugs and chemicals) <p>2. Physical exam</p> <p>3. Clinical laboratory studies</p> <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)e. Liver profile (including SGOT, SGPT, gamma glutamyl transpeptidase (GGT), alkaline phosphatase, total bilirubin, and indocyanin green clearance)	<p>Annually. Same as in A. (except chest X-ray).</p>	<p>Cancer hazard. Requirements apply to all workers exposed at or above 0.5 ppm.</p>

Vinyl chloride
(1910.1017)
(Chloroethene)

CHEMICAL AGENT

MEDICAL SURVEILLANCE PROCEDURES

COMMENTS

Xylene

- | A. PREPLACEMENT or BASELINE | B. PERIODIC |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Medical and work histories with attn. to <ul style="list-style-type: none">a. Nervous system (incoordination)b. Gastrointestinal disturbancesc. Alcohol consumptiond. Skine. Liverf. Kidneys | Annually. Same as in A. (except chest X-ray). |
| 2. Physical exam | |
| 3. Clinical laboratory studies <ul style="list-style-type: none">a. CBC and differentialb. Urinalysis with microscopicc. 14" x 17" post/ant chest X-rayd. Pulmonary function (FVC and FEV₁)e. Liver profile (including SGOT and SGPT)f. Kidney function (BUN and serum creatinine) | |

COMMENTS

MEDICAL SURVEILLANCE PROCEDURES

A. PREPLACEMENT or BASELINE B. PERIODIC

1. Medical and work histories Annually. Same as in A.
with attn. to the respiratory (except chest X-ray).
tract
2. Physical exam
3. Clinical laboratory studies
- a. CBC and differential
- b. Urinalysis with microscopic
- c. 14" x 17" post/ant
 chest X-ray
- d. Pulmonary function
 (FVC and FEV₁)

CHEMICAL AGENT

Zinc oxide

CHAPTER 3

MEDICAL SURVEILLANCE PROCEDURES
FOR PHYSICAL HAZARDS

(IN PREPARATION)

CHAPTER 4

MEDICAL SURVEILLANCE PROCEDURES
FOR BIOLOGICAL HAZARDS

(IN PREPARATION)